

1. (Unchanged) A method of cleaning a polishing pad surface subsequent to chemical-mechanical polishing (CMP) a wafer surface containing copper (Cu) or a Cu-based alloy, the method comprising applying to the polishing pad surface a cleaning composition comprising:

about 0.1 to about 3.0 wt.% of at least one organic compound containing one or more amine or amide groups;

an acid or a base in an amount such that the composition has a pH of about 5.0 to about 12.0; and

water.

2. (Unchanged) The method according to claim 1, wherein the composition is a solution comprising;

ethylenediamine;

an acid selected from the group consisting of phosphoric acid, acetic acid and sulfuric acid, or a base selected from the group consisting of potassium hydroxide, sodium hydroxide and ammonium hydroxide; and

the remainder deionized water.

3. (Unchanged) The method according to claim 1, wherein the composition is a solution consisting essentially of the organic compound, the acid or base and deionized water.

Sub 1
4. (Amended) The method according to claim 1, wherein the composition is a solution having a pH of about 5.0 to about 10.0.

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5. (Amended) The method according to claim 2, wherein:

Cu and/or Cu-containing by-products are generated during CMP on the polishing pad surface;

the organic compound forms at least one complex with the Cu and/or Cu-containing by-products generated during CMP; and

the at least one complex is (are) dissolved in the water.

6. (Unchanged) The method according to claim 4, comprising applying the solution to a rotating polishing pad at a flow rate of about 100 to about 600 ml/min
 7. (Unchanged) The method according to claim 6, comprising applying the solution to the polishing pad for about 3 seconds to about 20 seconds after conducting CMP on each of a plurality to wafers having a surface comprising Cu or Cu alloy.
 8. (Unchanged) The method according to claim 1 further comprising rinsing the polishing pad surface with water to remove any cleaning solution from the polishing pad surface, after applying the solution and prior to conducting CMP on a subsequent wafer.
 9. (Unchanged) The method according to claim 8, comprising rinsing by applying pressurized water to the polishing pad surface for about 2 seconds to about 20 seconds.
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Q2 10. (Amended) The method according to claim 1, further comprising removing any surface coating materials from the wafer surface before applying the cleaning composition to the polishing pad surface.

11. (Amended) The method according to claim 1, comprising conditioning the polishing pad surface before, during and after applying the cleaning solution.

12. (Amended) A method comprising the sequential steps:

(a) conducting chemical-mechanical polishing (CMP) of a first wafer containing copper (Cu) or a Cu-based alloy on a surface of a polishing pad;

(b) removing the first wafer from the polishing pad;

(c) applying to the polishing pad surface a cleaning composition comprising:

about 0.1 to about 3.0 wt.% of at least one organic compound containing one or more amine or amide groups;

an acid or a base in an amount such that the composition has a pH of about 5.0 to about 12.0; and

water;

(d) rinsing the polishing pad surface with water to remove any cleaning composition on the polishing pad surface;

G2 (e) conducting CMP on a second wafer; and

(f) repeating steps (b) through (e).

13. (Unchanged) The method according to claim 12, wherein the composition is a solution comprising:

ethylenediamine;

an acid selected from the group consisting of phosphoric acid, acetic acid and sulfuric acid, or a base selected from the group consisting of potassium hydroxide, sodium hydroxide and ammonium hydroxide; and

the remainder deionized water.

14. (Unchanged) The method according to claim 12, wherein the composition is a solution consisting essentially of the organic compound, the acid or base and deionized water.

Sub 2 15. (Amended) The method according to claim 12, wherein the composition is a solution having a pH of about 5.0 to about 10.0.

16. (Amended) The method according to claim 12, wherein;

G3 Cu and/or Cu-containing by-products are generated during CMP on the surface of the polishing pad;

the at least one organic compound forms at least one complex with the Cu and/or Cu-containing by-products;

the at least one complex is (are) dissolved in the water; and

the cleaning composition containing the dissolved complexes are removed during rinsing.

17. (Unchanged) The method according to claim 15, comprising applying the solution to a rotating polishing pad at a flow rate of about 100 to about 600 ml/min.

18. (Unchanged) The method according to claim 17, comprising applying the composition to the rotating polishing pad for about 3 seconds to about 20 seconds.

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26. (Added) A method of cleaning, comprising:
conducting chemical-mechanical polishing (CMP) of a first wafer on a surface of a polishing pad;
removing the first wafer from the polishing pad; and
applying to the polishing pad surface a cleaning composition, wherein the cleaning composition further comprises:
about 0.1 to about 3.0 wt.% of at least one organic compound containing one or more amine or amide groups;
an acid or a base in an amount such that the composition has a pH of about 5.0 to about 12.0; and
water.

27. (Added) The method according to claim 26, wherein the cleaning composition is a solution comprising:
ethylenediamine;
an acid selected from the group consisting of phosphoric acid, acetic acid and sulfuric acid, or a base selected from the group consisting of potassium hydroxide, sodium hydroxide and ammonium hydroxide; and
the remainder water.

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28. (Added) The method according to claim 26, wherein the cleaning composition is a solution having a pH of about 5.0 to about 10.0.

29. (Added) The method according to claim 26, wherein the cleaning composition is applied to a rotating polishing pad at a flow rate of about 100 ml/min to about 600 ml/min.

30. (Added) The method according to claim 26, wherein the cleaning composition is applied to a rotating polishing pad for about 3 seconds to about 20 seconds.

31. (Added) The method according to claim 26, further comprising rinsing the polishing pad surface with water to remove any cleaning composition on the polishing surface.

32. (Added) The method according to claim 26, further comprising conducting CMP on a second wafer after applying to the polishing pad surface the cleaning composition.

Remarks

This is intended as a full and complete response to the Office Action dated August 27, 2002, having a shortened statutory period for response set to expire on November 27, 2002. Please enter the following amendments and reconsider the claims pending in the application for reasons discussed below.

Claims 1-25 are pending in the application. Applicant confirms the election of Group I, claims 1-18 and cancels without prejudice claims 19-25. Applicant reserves the right to pursue the subject matters of claims 19-25 in a divisional application at a later date.

Claims 5 and 10 stand rejected under 35 U.S.C. 112, second paragraph. The Examiner states that claim 5 recites the limitation "deionized water" in line 4, and that there is insufficient antecedent basis for this limitation in the claim. The Examiner also states that claim 10 recites "removing any substrates from the wafer surface before